WAGAN® TECH

Item #2603

Elite™ 1000W PRO
DC to AC Pure Sine Inverter

User's Manual

INTRODUCTION

Thank you for purchasing the Elite™ 1000W PRO, Wagan Tech's pure sine wave DC to AC power inverter. It delivers a true sine wave AC identical to that of commercial power. Use this inverter to power AC appliances in your vehicle, at a campsite, or at home as an emergency source of AC power. Pure sine wave AC means that your sensitive electronics such as audio/video systems, computers, and communications equipment will operate properly. This inverter is powered from 12 volts DC, and it will continuously deliver 1,000 watts AC power at 115 Volts, 60 Hz.

For your convenience, this inverter is supplied with a remote control and a set of cables. The installer must install a fuse and fuse holder for battery protection. See "Configuring Battery Bank" section.

This Elite™ 1000W PRO inverter is an indispensable addition to your compliment of mobile power equipment. With minimal care and proper treatment it will provide years of reliable service. Please read and understand this manual before installing and operating this inverter. Keep this manual for future use.

ABOUT THIS INVERTER

This power inverter converts 12 volts, direct current (12V DC) to 115 volts alternating household current (115V AC). It easily powers TV/VCR combinations, small microwave ovens, and refrigerators. It also operates at high efficiency (up to 90%) that results in long running time and extended battery life compared to other inverters with this level of power output.

This inverter has the highest surge capability in its class. Superior surge capability of 2,000 watts allows the inverter to start most difficult motorized appliances. Advanced microprocessor-controlled circuits run cooler and are more reliable than competing units.

GENERAL INSTRUCTIONS:

- Keep the inverter away from any direct heat source or combustible materials.
- Keep well ventilated–this device generates heat.
- Keep the inverter away from combustible gases.
- Do not continuously operate any equipment over 1,000 watts.
- This inverter is designed to operate from a 12 volt DC power source only.
- Do not attempt to connect the inverter to any other power source, including any AC power source.
- Incorrect battery polarity will damage the inverter and void the warranty.
- Keep this inverter in a dry environment.
- Do not open the inverter; there are no user serviceable parts inside.

SAFETY WARNING!
The inverter output can be lethal. Improper use of this inverter may result in property damage, personal injury, or loss of life.

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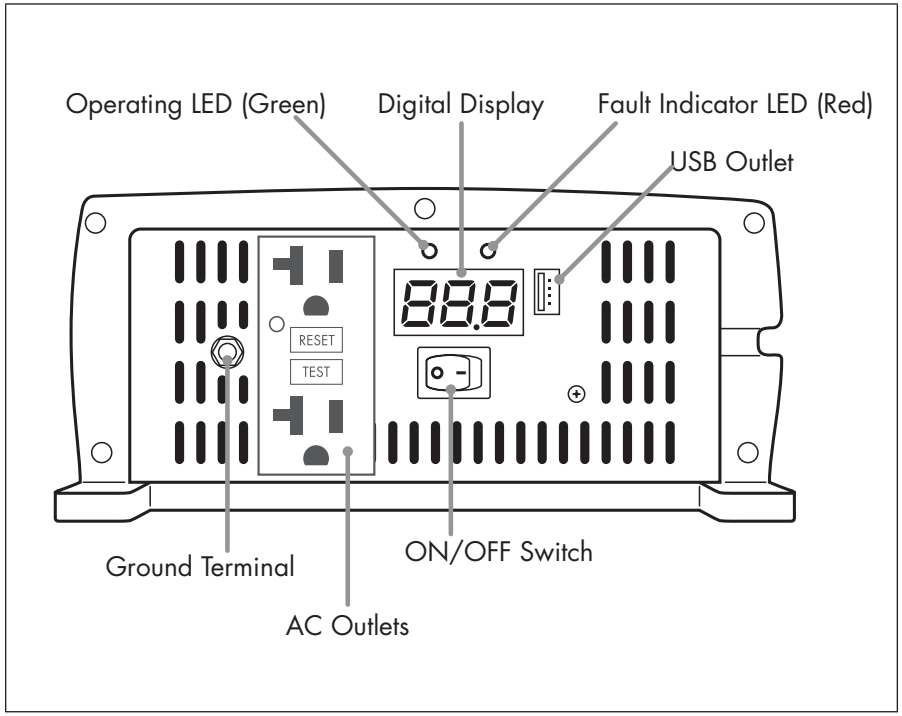
PRODUCT FEATURES

Front Panel

The Front Panel view shows the inverters ON/OFF Switch, Indicators, AC Outlets, USB Power Port, and Ground Terminal.

- ON/OFF Switch: This switch controls AC output of the inverter.
- Operating LED (green): When this green LED is lit, the inverter is operating normally.
- FAULT indicator (red): This red LED will light up as the inverter shuts down because of: excessive temperature, overload, under-voltage, or over-voltage.
  - » Immediately turn off all AC appliances if the FAULT LED is lit. Allow the inverter to cool before continuing. Make sure that the ventilation vents are not blocked.
  - » If an inverter "shutdown" was preceded by a buzzing sound, there may excessive load, in combination with a low voltage or cable problem.
  - » Observe the Digital Display for low battery voltage. Normal operating range is 11V to 15V DC.
- Digital Display: The digital display alternates between input voltage and output power (kilowatts). The DC input voltage displayed is what the inverter senses at its terminals. Low battery and excessive load for the cables can cause a low voltage reading and inverter shutdown. Low battery is also indicated when the audible alarm sounds. The wattage displayed for the output power is a rough estimate of the load being applied to the inverter. A multimeter should be used for a more accurate reading of the load.
- USB Power Port: This USB Power Port provides 5 Volts DC to charge cell phones, personal media players, and a host of USB powered appliances. A user-supplied adapter cord is required to use this USB Power Port.
- Audible Alarm (internal to the inverter): When the audible alarm makes a buzzing sound, the inverter senses a low-battery condition. The user should reduce the AC load, charge the battery, and check the DC cable or excessive losses.
- Ground Terminal: Grounding the inverter enclosure ensures personnel safety should a DC cable problem occur. During the installation procedure, the Ground Terminal is connected either to a vehicle chassis or to the negative DC terminal of the battery. Do not directly connect this ground connection to the negative DC terminal of the inverter. Use an insulated 10 gauge wire to make the ground connection. If the inverter installation is located in fixed location, the safety wire can be connected to earth's ground.



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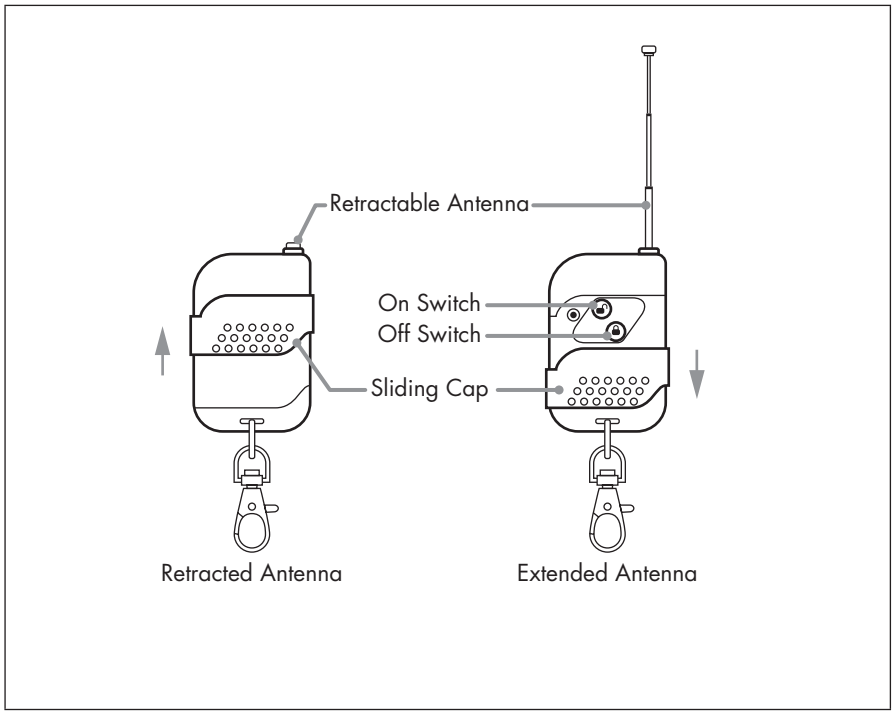
Remote On/OFF Switch

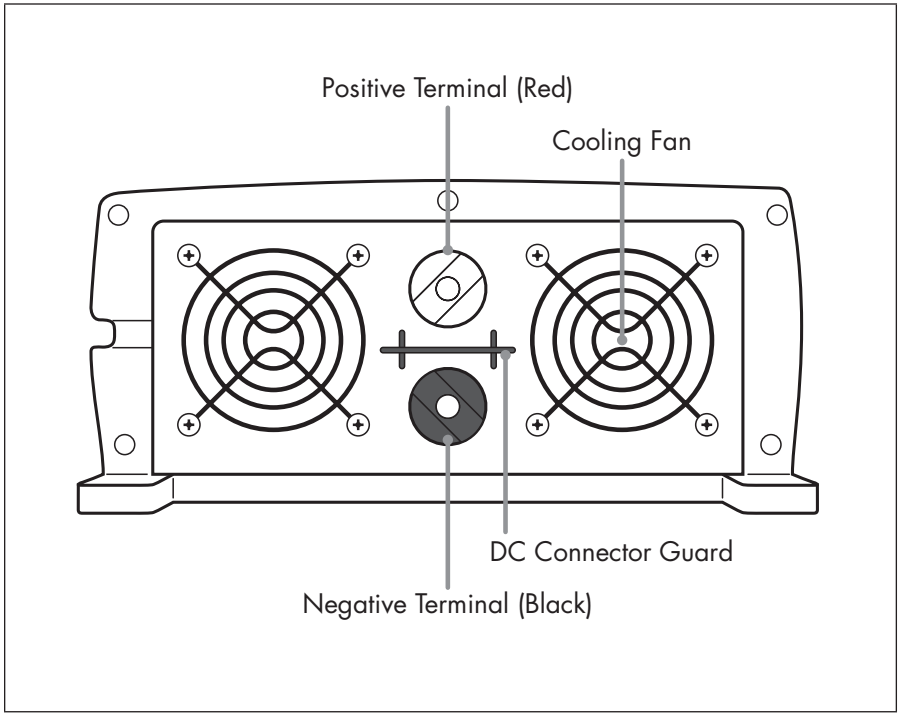
This inverter is supplied with a 100-foot range, battery-powered, wireless remote ON/OFF feature. To enable the Remote Switch, the front panel On/Off Switch of the inverter must be in the "on" position.

To turn on the inverter, momentarily press "unlock" button. To turn the inverter off, momentarily press "lock" button. If the wireless remote fails to control operation of the inverter, you may be out of range for the radio signal—move closer to the inverter. If the remote switch has a depleted battery, open the unit by unscrewing the three small screws on the back side of the remote control and replace the 12 volt, 23A alkaline battery with a new one.



Rear Panel

- Positive Terminal (red): Positive DC Input
- Negative Terminal (black): Negative DC Input
- DC Connector Guard: Protects your DC cables from accidentally touching.
- Ground Terminal: Grounding the inverter enclosure ensures personnel safety should a DC cable problem occur. During the installation procedure, the Ground Terminal is connected either to a vehicle chassis or to the Negative DC Terminal of the battery. Do not directly connect this ground connection to the negative DC terminal of the inverter. Use an insulated 10 gauge wire to make the ground connection. If the inverter installation is located in fixed location, the safety wire can be connected to earth's ground.
- Cooling Fans: High-speed and temperature controlled



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LOAD CONSIDERATIONS

When an appliance with a motor starts, it requires a momentary surge of power. This surge of power is the "starting load" or "peak load". Once started, the appliance requires less power to continue to operate. This is known as the "continuous load". It is important to know the starting loads and the continuous loads of the appliances that are to be powered by the inverter.

Appliance power is rated in watts. This information is usually stamped or printed on most appliances and equipment. In some cases, a tool will be rated in amperes. To convert from amps to watts, multiply:

Amps x 115 (AC voltage) = Watts

This formula yields an approximation of the continuous wattage load of that appliance. **The startup load of an appliance is a major factor of whether this inverter can power it.**

Startup load is momentary. With many appliances, it is approximately twice the continuous load, but some appliance startup loads can be as high as eight times the continuous load.

To determine if an appliance or tool will operate with this inverter, run a test. This inverter will automatically shut down in the event of an output overload, so there is no danger of damaging either the inverter or the equipment. When lit, a red LED indicator signals a fault.

PLANNING THE INVERTER SYSTEM

Any large wattage inverter system requires planning before installation. There are several steps to the planning process so the user must determine the following:

- Maximum inverter wattage required.
- Operating time (run time) needed between battery recharges.
- Battery bank capacity in amp-hours.
- Charger requirement to charge batteries within a practical time.
- Distance between battery bank and inverter.

DETERMINING MAXIMUM APPLIANCE WATTAGE

Microwave oven specifications list cooking power (watts) and appliance power. Appliance power is the AC load the inverter has to supply. Do not exceed the 1,000 watt maximum AC load or the inverter will shut down.

Most other electrical tools, appliances, and audio/video equipment have labels that list the unit's power requirements in watts. If the tool or device is rated in amps, multiply the amps by 115 (115V AC) to determine the watts. For example, a power tool rated at 4 amps will draw 460 watts.

Remember to consider the startup surge that motorized appliances will cause. Do not exceed the 2,000 Watt surge rating of this inverter. This can cause immediate overload shut down.

At 1,000 watts continuous output, this inverter requires a DC power supply (battery bank) that can continuously supply 100 amps for the duration of the run time.

CONFIGURING THE BATTERY BANK

To determine the minimum battery ampere-hour rating that you will need to operate appliances from the inverter and any DC appliances powered by the battery bank, follow these steps:

1. List the maximum continuous wattage that the inverter has to supply.
2. Estimate the number of hours the appliances will be in use between battery recharges. This will vary depending on appliances. For example, a typical home-use coffee maker draws 500 watts during its brew time of 5 minutes. It maintains the temperature of the pot, requiring 100 watts. Typical use of a microwave oven is only for a few minutes. Some longer operating time appliances are lamps, TVs, computers, and refrigerator/freezers.

Determine the total watt-hours of energy needed. This is done by multiplying average power consumption in watts by hours of run time. For example: 500 watts for 10 hours = 5,000 watt hours. To get an estimate of the maximum current (in amps) that a battery bank must be capable of delivering to the inverter, divide the load watts by ten. For example a 500 watt appliance load will need 50 amps at 12 volts DC. Using the 500 watts (or 50 amps) for 10 hours example as above, then 50 amps is needed for 10 hours. This provides us with the basic amp-hours (AH) of battery that is required. Ten hours at 50 amps equals 500 amp-hours (AH). There are additional factors that determine actual run time. These include:

- AC appliance load and time in use (basic AH).
- Cable gauge and length (cable losses).
- Charge level of the batteries (between use, chargers have to be able to fully charge the batteries).
- Temperature of the batteries (colder batteries provide fewer amps).
- Age and condition of the batteries (older batteries lose AH capacity).
- Compliance with turning off unnecessary AC loads.
- Use of DC appliances and compliance with turning off unnecessary DC loads.

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DERATING THE BATTERY BANK

Most lead-acid batteries have a rating expressed in amp-hours (AH). The most common rating of AH is "at the 20 hour rate".

NOTE: Despite several internet explanations, there is no relationship between cold cranking amps (CCA) and ampere-hours (AH).

For example, if a 20 AH battery is discharged at a 1 amp rate, is will take 20 hours to discharge that battery. The terms "charged" and "discharged" relate to actual battery voltage. This means that the output voltage of a nominal 12 volt battery starts at 13.4 volts (fully charged) then drops to 10.7 volts (discharged). If the load on the battery causes the battery to discharge faster than the 20 hour rate, the capacity (AH) of the battery is measurably reduced (derated). In heavy battery discharge applications, double the estimated Amp Hour rating and configure batteries to support this capacity. If the batteries are frequently charged by an alternator, the Amp Hour rating of the battery may be reduced.

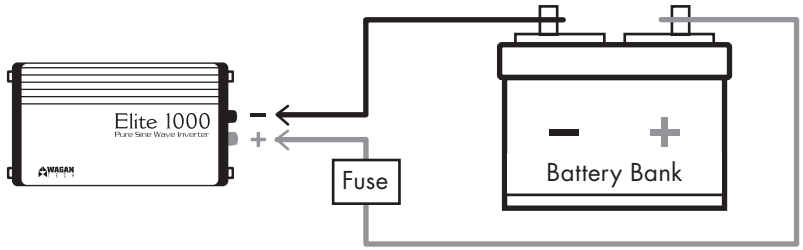
CONFIGURING THE BATTERY BANK

Batteries that are used indoors or inside a vehicle or vessel, should be deep-cycle, sealed lead acid batteries.

NOTE: It is important that for any inverter installation to battery protection fuses. Battery fuses are added to the positive (+) battery cable as close as possible to the battery bank's positive terminal. The fuse amperage rating must be sized to allow simultaneous operation of all the AC appliances to be powered, plus 20 percent safety factor. Fuses are very important to protect equipment, batteries, and personnel. The fuses protect against battery explosion if the cables that connect to the inverter accidentally short.

BATTERY BANK DIAGRAM

The diagram below shows inverter connections to a battery bank with recommended fuse protection.



WARNING—Exploding Batteries!!
Exploding batteries can spray molten lead, hot sulfuric acid, and other metal, and plastic fragments. Batteries that are charging or under high discharge rates produce explosive hydrogen gas into the surrounding area. Be safe–fuse the battery bank and make sure the batteries are properly ventilated.

DC CABLE GAUGE

Minimize cable losses by using the thickest wire available and the shortest practical length.

Measure Round Trip (RT) cable distances in feet. Round Trip cable distance is battery to inverter and back to battery. If the application is in a vehicle with engine operating, use the supplied cables for round trip distances up to 5 feet.

Use a recommended ANL fuse and Fuse holder. Fuse at 125 to 150 Amps. ANL are quick acting and sealed so they do not spark when they blow. Place fuse no more than one foot from the Positive (+) terminal of the battery.

RT Length	Up to 2 Ft	3-4 Ft	5-6 Ft	7-9 Ft	14-16 Ft
AWG	6	4	2	0	0

If the inverter and the battery are positioned within four feet of each other, a minimum of 7AWG insulated copper wire should be used to make the connections. If the distance is longer than 32 inches (2.6 ft), heavier wire will be required.

CONNECTING THE INVERTER

Loose connections will result in a severe voltage drop that can cause damage to connectors, conductors, and insulation and can cause sparking. Reverse polarity connection will blow the fuses in the inverter and can permanently damage to the inverter. Damage caused by reverse polarity will void the warranty.

Installation Procedure:

1. Mount the inverter in a secure location. If the inverter is to be mounted on a wall, mount it horizontally. Make sure that the front and rear of the inverter has free air flow.
2. Make sure the cables are the proper gauge and have the fuse holder as close to the battery bank's Positive (red) terminal.
3. Install the fuse in the Positive (red) cable.
4. Make sure the ON/OFF switch located on the front panel of the inverter is in the OFF (O) position.

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5. Locate the ground lug terminal on the inverter. Connect an insulated 10 gauge copper wire to the terminal. The other end of the ground wire is connected to a "proper" grounding point. Use the shortest practical length of wire. Connect this wire to the chassis of your vehicle or to the grounding system in your boat. In a city, the ground wire can connect to a metal cold water pipe that goes underground. In remote locations, the ground wire can be connected to an "earth ground". This can be an attachment to a foot long copper clad metal rod driven into the ground. In the unlikely event of a short circuit, operating the inverter without proper grounding can result in electrical shock. Do not directly connect this ground wire to the Negative (black) DC Terminal of the inverter. As an alternative grounding connection, use the Negative (black) terminal of the battery.

   NOTE: Crimp-on ring terminals are required on all cable ends. The cable ends need to be stripped of insulation for ½ inch before crimping on ring terminals. Select a crimp terminal size to fit the gauge cable and inverter and battery terminal connectors. After crimping make sure that the cable connectors are secure on the cables so there are no loose connections.

6. Connect the Negative (black) cable end to the inverter terminal and battery Negative Terminal. Make sure you have good, secure connections.

7. Recheck and make sure the DC cable fuse is installed in the fuse holder.

   CAUTION: Making an initial connection between the positive cable end and the inverter's positive terminal may cause a spark. This is a normal and is a result of capacitors in the inverter starting to charge. Because of the possibility of sparking, it is extremely important that both the inverter and the battery bank be positioned away from any source of flammable fumes or gases. Failure to heed this warning can result in fire or explosion. Do not make the positive terminal connection immediately after the batteries have been charging. Allow time for the battery gasses to vent to outside air.

8. Attach the positive cable to the Positive DC connector on the battery and then the inverter. Make sure the connections are tight and secure.

9. Turn ON the inverter from the Front Panel On/OFF Switch

10. Make certain that the green Operating LED is lit and the FAULT LED indicator is not lit.

11. Turn OFF (O) the inverter. The Fault LED may briefly "flash". This is normal. The audible alarm may also sound a short "chirp". This is also normal.

12. When you have confirmed that the appliance to be operated is turned off, plug the appliance into one of the two AC outlets on the front panel of the inverter.

13. Turn the inverter on.

14. Check operation of the Remote Switch. Press "lock" to turn off the inverter.

15. Press the "unlock" button to turn on the inverter.

16. Turn the appliance on. The appliance should begin working.

17. Observe the LED indicators and the digital display for normal operation.

Note: If an extension cord is used from the inverter to the appliance, limit the extension cord length to 100 feet or less. Make sure that the cord is safety approved and AWG 14 or greater to carry the appliance load. Remember that extension cords are for temporary use.

CHARGING THE BATTERY BANK

It is not the purpose of this inverter user's guide to provide detailed information regarding battery charging systems. However, the user should try to augment any stationary inverter charging system with either wind power or solar power. These can continue to operate during power outages and they also reduce recharge time. For mobile or marine charging systems, a higher rated alternator may be necessary to charge a battery bank.

REGULAR LOSS OF COMMERCIAL POWER

If the inverter system is used during commercial power outages that occur daily, configure the charger system to replace energy during the time that commercial power is available.

Replacement of battery energy always requires more than was taken from the battery (typically 30 percent more). Follow battery manufacturer's recommendations for maximum charging current.

WARNING: There is danger of explosion. DO NOT connect or disconnect charger cables directly after battery discharge or recharge—make sure that the battery bank area is well vented before attaching or removing cables.

If the flooded lead acid batteries are used, be sure that periodic checks of battery electrolyte levels are accomplished. Follow battery manufacturer's instructions in keeping the electrolytes at the proper level. Be sure to use pure distilled water when replacing evaporated electrolyte liquid.

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OPERATING ISSUES

(Television and Audio Equipment Suggestions.)

Although all inverters are shielded and filtered to minimize signal interference, some interference with your television picture may be unavoidable, especially with weak signals. However, here are some suggestions that may improve reception.

- Make sure that the television antenna produces a clear signal under normal operating conditions (i.e. at home plugged into a standard 115V AC wall outlet). Also ensure that the antenna cable is properly shielded and of good quality.
- Sometimes vehicle alternators produce some electrical noise. There are filters available to mount on the alternator to reduce noise.
- Change the positions of the inverter, antenna cables, and television power cord.
- Isolate the television, its power cord and antenna cables from the 12 volt power source by running an extension cord from the inverter to the television set.

TROUBLESHOOTING

PROBLEM: Low or No Output Voltage – Fault LED Lit

Reason	**Solution**
Poor contact with battery or inverter terminals.	Clean terminals thoroughly. Reinstall and tighten.

PROBLEM: Inverter is Shut Down – Fault LED Lit

Reason	**Solution**
Battery voltage below 10.4 Volts	Charge or replace battery.
Inverter is too hot (thermal shut down mode).	Allow inverter to cool. Check for adequate ventilation. Reduce the load on the inverter to rated continuous power output.
Unit may be defective.	See warranty and call customer service.

PROBLEM: Inverter Shut Down – Fault LED Lit – Display shows overload

Reason	**Solution**
Equipment being operated draws too much power.	Use a higher capacity inverter or do not use this equipment.

PROBLEM: Continuous Buzzing Sound – Display Shows Low Voltage

Reason	Solution
Input voltage below 11 Volts	Keep input voltage above 11 Volts
Poor or weak battery condition.	Recharge or replace battery.
Poor or loose cable connection	Inspect terminals and tighten all connections.
Inadequate power being delivered to the inverter or excessive voltage drop.	Use heavier gauge DC cable. Keep cable length as short as possible.

DISPOSAL/RECYCLING OF INVERTER

Electronic products are known to contain materials that are toxic if improperly disposed. Contact local authorities for disposal and recycling information.

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SPECIFICATIONS*

- Output Waveform: True Sine Waveform
- Input: 11V–15V DC
- Output: 110V–120V
- TrueRated Power™ (24-hour continuous): 1,000 watts
- Peak Surge: 2,000 watts
- Efficiency: ~ 90%
- Frequency: 60Hz
- Total Harmonic Distortion (THD): < 3%
- No Load Current Draw: 0.6A
- Battery Low Alarm: 10.5V ± 0.5V DC
- Battery Low Shutdown: 9.5V ± 0.5V DC
- Over Voltage Shutdown: 15.5V ± 0.5V DC
- Cooling Fan: controlled by temperature
- AC Output Sockets: 2 North American (NEMA 5-15), GFCI
- True Ground
- USB Power Port: 2.1A, 5V ± 0.25V
- Power Switch: DC input ON/OFF control
- Digital Status Display
- Dimensions: 13.4 in. x 8.1 in. x 3.5 in. (34.0 cm x 20.5 cm x 9.0 cm)
- Net Weight: 9.3 lbs (4.2 kg)

*All specifications are typical, at half load, 77°F (25°C) and 13.5V DC input unless otherwise noted. Specifications are subject to change without notice.

WAGAN Corp. Limited Warranty

The WAGAN Corp. warranty is limited to products sold only in the United States.

All Wagan Tech products must be registered within (30) days of purchase to activate its warranty. To register your product, please visit *http://tinyurl.com/waganwarranty*. Be sure to keep the original receipt as it will be required when returning a product under the warranty.

Warranty Duration: This product is warranted to the original purchaser for a period of two (2) years from the original purchase date, to be free of defects in material and workmanship. WAGAN Corporation disclaims any liability for consequential damages. In no event will WAGAN Corporation be responsible for any amount of damages beyond the amount paid for the product at retail.

Warranty Performance: During the above two (2) year warranty period, a product with a defect will be replaced with a comparable model when the product is returned to WAGAN Corporation with an original store receipt. The replacement product will be in warranty for the balance of the original two (2) year warranty period.

To return a defective item, please contact WAGAN Corporation at (800) 231-5806 to obtain a Returned Merchandise Authorization number (RMA#), and return instructions. Each item returned will require a separate RMA#. After you have received the RMA# and the return instructions from WAGAN Corporation, please follow the instructions and send the item with PREPAID SHIPPING, along with all of the required documentation, a complete explanation of the problem, your name, address and daytime phone number. WAGAN Corporation will, at its option, replace or repair the defective part.

A Returned Merchandise Authorization number (RMA#) is REQUIRED when sending in any defective item. WAGAN Corporation is not responsible for any item(s) returned without an official Returned Merchandise Authorization number. The item(s) must be returned with prepaid shipping. WAGAN Corporation is not responsible for any shipping charges incurred in returning the item(s) back to the company for repair or replacement. This warranty is void if the product has been damaged by accident, in shipment, unreasonable use, misuse, neglect, improper service, commercial use, repairs by unauthorized personnel or other causes not arising out of defects in materials or workmanship. This warranty does not extend to any units which have been used in violation of written instructions furnished.

Warranty Disclaimers: This warranty is in lieu of all warranties expressed or implied and no representative or person is authorized to assume any other liability in connection with the sale of our products. There shall be no claims for defects or failure of performance or product failure under any theory of tort, contract or commercial law including, but not limited to negligence, gross negligence, strict liability, breach of warranty and breach of contract.

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